A method of producing a mammal [having a predetermined sex] comprising the steps of:

a. collecting sperm cells from a male of a species of mammal;

[b. determining the sex characteristic of a plurality of said sperm cells;

c. sorting said sperm cells according to the determination of their sex characteristic;]

b,d. establishing an [sorted artificial] insemination sample having [from about 10% to about 50% of the] a low number of said sperm cells relative to a typical [unsorted artificial] insemination sample;

c,e. inserting said [sorted artificial] insemination sample having said low number of said sperm cells into a female of said species of said mammal;

d,f. fertilizing at least one egg within said female of said species of said mammal at success levels statistically comparable [($p>0.1$)] to [said] a typical [unsorted artificial] insemination dosage; and

e,g. producing an offspring mammal [of the desired sex].

Claim 2 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 1 wherein said step of fertilizing at least one egg within said female of said species of said mammal at success levels statistically comparable to a typical insemination dosage comprises the step of fertilizing said at least one egg within said female of said species at success levels selected from the group consisting of at least 35%, at least 41%, at least 50%, and at least 90% [collecting sperm cells from a male of a species of mammal comprises the step of collecting said sperm cells from said male of said species of said mammal selected from the group consisting of bovines, and equines].

Claim 3 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 1 or 2 wherein said step[s] of establishing an insemination sample having a low number of said sperm cells relative to a typical insemination dosage comprises the step of

establishing an insemination sample having no more than ten percent of the typical number of sperm provided in said typical insemination dosage [inserting said sorted artificial insemination sample into a female of said species of said mammal and fertilizing at least one egg within said female of said species of said mammal at success levels statistically comparable ($p>0.1$) to the typical unsorted artificial insemination dosage are each accomplished in a field environment].

Claim 4 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 3 wherein said steps of inserting said [sorted artificial] insemination sample into a female of said species of said mammal and fertilizing at least one egg within said female of said species of said mammal at success levels statistically comparable [($p>0.1$)] to the typical [unsorted artificial] insemination dosage are each accomplished in a field environment [comprises the steps of repetitively inserting a significant number of said sorted artificial insemination samples into a significant number of said females of said species of said mammal in rapid succession and in farm or ranch conditions].

Claim 5 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 3 wherein said female of said species of said mammal has uterine horns and wherein said step of inserting said [sorted artificial] insemination sample into said female of said species of said mammal comprises the step of inserting said [sorted artificial] insemination sample both ipsi- and contra-lateral within the uterine horns of said female of said species of said mammal.

Claim 6 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 3 wherein said female of said species of said mammal has at least one uterine horn and wherein said step of inserting said [sorted] insemination sample into said female of said species of

said mammal comprises the step of inserting said [sorted artificial] insemination sample deep within said uterine horn.

Claim 7 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 5 wherein said step of inserting said [sorted artificial] insemination sample into a female of said species of said mammal further comprises the step of inserting said [sorted artificial] insemination sample deep within said uterine horns.

Claim 8 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 6 wherein said step of inserting said [sorted artificial] insemination sample into a female of said species of said mammal further comprises the step of inserting said [sorted artificial] insemination sample within said uterine horn through the use of embryo transfer equipment.

Claim 9 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 7 wherein said step of inserting said [sorted] insemination sample into a female of said species of said mammal further comprises the step of inserting said [sorted artificial] insemination sample within said uterine horns through the use of embryo transfer equipment.

Claim 10 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 5 wherein said step of inserting said [sorted artificial] insemination sample into a female of said species of said mammal comprises the step of inserting said [sorted artificial] insemination sample twelve hours after the time which is generally regarded as optimal for a single [artificial] insemination.

Claim 11 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 9 wherein said step of establishing a [sorted] insemination sample comprises the step of establishing an unfrozen [sorted artificial] insemination sample, [wherein said step of sorting said sperm cells according to the determination of their sex characteristic occurs at a sorting time, and] wherein said step of inserting said [sorted artificial] insemination sample into a female species of said mammal occurs not later than about seventeen hours from said [sorting time] step of establishing said insemination sample having a low number of said sperm cells relative to the typical artificial insemination dosage.

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Claim 12 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 9 wherein said step of establishing a [sorted artificial] insemination sample comprises the step of establishing an unfrozen [sorted artificial] insemination sample, [wherein said step of sorting said sperm cells according to the determination of their sex characteristic occurs at a sorting time, and] wherein said step of inserting said [sorted artificial] insemination sample into a female species of said mammal occurs not later than about ten hours from said [sorting time] step of establishing said insemination sample having a low number of said sperm cells relative to the typical artificial insemination dosage.

Claim 13 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 1 further comprising the [wherein said] step of determining a sex characteristic of a plurality of said sperm cells [comprises the step of staining said sperm cells with at least about 38 micro-molar content of stain].

Claim 14 (once amended).

A method of producing a mammal having a predetermined sex as described in claim 13 further comprising the [wherein said] step[s] of [determining the sex characteristic of a plurality of said sperm cells and sorting] separating said sperm cells according to the

determination of said sex characteristic [comprise the steps of:

a. establishing a cell source which supplies sperm cells to be sorted;

b. chemically coordinating a sheath fluid to create a sheath fluid environment for said sperm cells which is coordinated with both a pre-sort and a post-sort sperm cell fluid environment;

c. sensing a property of said sperm cells;

d. discriminating between said sperm cells having a desired sex characteristic; and

e. collecting said sperm cells having the desired sex characteristic].

Claim 15 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 14 wherein said step[s of determining the sex characteristic of a plurality of said sperm cells and sorting] <u>separating</u> said sperm cells according to the determination of their sex characteristic comprises the steps of:

a. establishing a <u>sperm</u> cell source which supplies [bovine] sperm cells to be [sorted] <u>separated</u>;

[b. establishing a sheath fluid for said bovine sperm cells which contains about 2.9% sodium citrate;]

b. sensing a property of said [bovine] sperm cells;

c. discriminating between said [bovine] sperm cells having a desired sex characteristic; and

d. collecting said [bovine] sperm cells having the desired sex characteristic.

Claim 16 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 15 wherein said steps of [determining the sex characteristic of a plurality of said sperm cells and sorting] <u>separating</u> said sperm cells according to the determination of their sex characteristic further comprises the steps of:

a. [establishing a cell source which supplies equine sperm cells to be sorted] <u>providing a flow cytometer</u>;

b. establishing a sheath fluid for said [equine] sperm cells [which contains a hepes buffered medium];

[c. sensing a property of said equine sperm cells;

d. discriminating between said equine sperm cells having a desired sex characteristic;] and

e. collecting said [equine] sperm cells having the desired sex characteristic.

Claim 17 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 16 wherein [said steps of determining the sex characteristic of a plurality of said sperm cells and sorting said sperm cells according to the determination of their sex characteristic comprise the steps of:

a. establishing a cell source which supplies sperm cells to be sorted;

b. establishing a sheath fluid for said sperm cells;

c. sensing a property of said sperm cells;

d. discriminating between said sperm cells having a desired sex characteristic; and

e.] collecting said sperm cells having the desired sex characteristic [while] <u>further comprises the step of</u> cushioning said sperm cells from impact with a collector [wherein a cushioning element comprises initial collection fluid in the bottom of said collector and wherein said collector has a configuration sufficiently large to avoid impact of said sperm cells with said collector].

Claim 18 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 16 wherein said step[s] of [determining the sex characteristic of a plurality of said sperm cells and sorting said sperm cells according to the determination of their sex characteristic comprise the steps of:

a. establishing a cell source which supplies sperm cells to be sorted;

b. establishing a sheath fluid for said sperm cells;

c. sensing a property of said sperm cells;

d. discriminating between said sperm cells having a desired sex characteristic; and

e. collecting said sperm cells having the desired sex characteristic in a citrate collection fluid containing about six percent egg yolk prior to commencing said step of collecting] providing a sorting flow cytometer comprises providing a high speed sorting flow cytometer, wherein said high speed flow cytometer sorts said sperm cells at a rate of at least 500 sorts per second.

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Claim 19 (once amended).

A method of producing a mammal [of a desired sex] as described in claim 3 and further comprising the step of [sorting said sperm cells at a rate of at least 500 sorts per second] using an ovulatory pharmaceutical to cause multiple eggs to be produced.

Claim 20 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 19 [and further comprising the step of using an ovulatory pharmaceutical to cause multiple eggs to be produced and wherein said step of fertilizing at least one egg within said female of said species of said mammal at success levels statistically comparable ($p>0.1$) to the typical unsorted artificial insemination dosage comprises the step of fertilizing a plurality of said eggs to produce multiple, embryos having a predetermined sex,] wherein said ovulatory pharmaceutical is injected in half day increments between any of days 2 and 18 of the estrus cycle.

Claim 21(once amended).

A method of producing a mammal having a predetermined sex as described in claim 20 wherein said step of using an ovulatory pharmaceutical to cause multiple eggs to be produced comprises the step of injecting a dosage of follicle stimulating hormone.

Claim 22 (once amended).

A method of producing a mammal having a predetermined sex as described in claim 21 wherein said step of injecting said dosage of follicle stimulating hormone in approximately half day increments comprises a dosage level of 6, 6, 4, 4, 2, 2, 2, and 2 mg between days 9 and 12 inclusive of the estrus cycle and further comprising the step of injecting 25 and 12.5 mg of prostaglandin F-2-alpha on the sixth and seventh dosages, respectively, of said follicle stimulating hormone.

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Claim 23 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 16 and wherein said step of determining the sex characteristic of a plurality of said sperm cells and said step of sorting said sperm cells according to the determination of their sex characteristic further compris[ing] the step[s] of[:

a.] staining sperm cells of a male mammal with at least about 38 micro-molar content of stain[;

b. sorting said sperm cells of said male mammal at a rate of at least 500 sorts per second; and

c. concentrating said sorted sperm cells of said male mammal].

Claim 24 (once amended).

A method of producing a mammal having a predetermined sex as described in claim 16 [where said step of determining the sex characteristic of a plurality of said sperm cells comprises the step of staining said cells with a 38 micro-molar concentration of stain] <u>further comprising the step of chemically coordinating a sheath fluid environment for sperm cells which is coordinated with both pre-sort and post-sort sperm cell fluid environments</u>.

Claim 25 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 1, 2, 14, 15, 16, 17 or 18 [and further comprising the step of chemically coordinating a sheath fluid environment for sperm cells which is coordinated with both pre-sort and post-sort

sperm cell fluid environments] wherein collecting sperm cells from a male of a species of mammal comprises collecting said sperm cells from a male of a species selected from the group consisting of bovines, and equines.

Claim 26 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 25 wherein said step of chemically coordinating a sheath fluid to create a sheath fluid environment for said sperm cells which is coordinated with both a pre-sort and a post-sort cell fluid environments comprises the step of establishing a cell source which supplies bovine sperm cells and the step of establishing a sheath fluid which contains about 2.9% sodium citrate.

Claim 27 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 25 wherein said step of chemically coordinating a sheath fluid to create a sheath fluid environment for said cells which is coordinated with both a pre-sort and a post-sort cell fluid environment comprises the step of establishing a cell source which supplies equine sperm cells and the step of establishing a sheath fluid which contains a hepes buffered medium.

Claim 28 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 16 wherein said step of [sorting said sperm cells according to the determination of their sex characteristic] collecting said sperm cells having the desired sex characteristic further comprises the step of [cushioning said cells from impact with a collector wherein cushioning said sperm cells comprises collecting said sperm cells into an initial collection fluid in the bottom of said collector and wherein said collector has a configuration sufficiently large to] avoiding impact of said sperm cells with said collector.

Claim 29 (once amended).

A method of producing a mammal [having a predetermined sex] as described in claim 28 wherein said step of [cushioning said cells from impact with a collector] avoiding impact of said sperm cells with said collector comprises the step of providing a collection container having a diameter of at least fifteen millimeters.

Please add the following claims:

Claim 183 (newly added).

A method of producing a mammal as described in claim 28 wherein said step of avoiding impact of said sperm cells with said collector comprises the step of providing a collection container having stream matched physical characteristics.

Claim 184 (newly added).

A method of producing a mammal as described in claim 16 wherein said step of collecting said sperm cells having the desired sex characteristic further comprises the step of providing a citrate collection fluid containing about six percent egg yolk prior to commencing said step of collecting.

Claim 185 (newly added).

A method of producing a mammal as described in claim 18 further comprises the step of operating said flow cytometer with in the range of about 5 kilohertz to about 50 kilohertz.

Claim 186 (newly added).

A method of producing a mammal as described in claim 185 further comprises the step of sorting said sperm at a rate of at least 1200 sorts per second.

Claim 187 (newly added).

A method of producing a mammal as described in claim 3 wherein said step of establishing an insemination sample having a low number of said sperm cells relative to the typical artificial insemination dosage comprises the step of establishing an insemination sample

selected from the group consisting of: a bovine insemination sample of no more than one hundred thousand sperm cells, a bovine insemination sample of no more than two hundred fifty thousand sperm cells, a bovine insemination sample of no more than three hundred thousand sperm cells, an equine insemination sample of no more than one million sperm cells, an equine insemination sample of no more than five million sperm cells, an equine insemination sample of no more than ten million sperm cells, and an equine insemination sample of no more than twenty-five million sperm cells.

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Claim 188 (newly added).

A method of producing a mammal as described in claim 4 wherein said steps of inserting at least a portion of said insemination sample into a female species of said mammal and fertilizing at least one egg within said female species of said mammal at success levels statistically comparable to the typical unsexed artificial insemination dosage in a field environment comprises the steps of repetitively inserting a significant number of insemination samples into a significant number of female specie of said mammal in rapid succession and in farm or ranch conditions.

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Claim 189 (newly added).

A method of producing a mammal as described in claim 14 wherein said step of inserting said insemination sample having said low number of said sperm cells into a female of said species of said mammal comprises inserting an insemination sample having a low number of sperm a substantial portion of which have the desired sex characteristic.

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Claim 190 (newly added).

A method of producing a mammal as described in claim 189 wherein said step of inserting an insemination sample having a low number of sperm, wherein a substantial portion of said sperm have the desired sex characteristic comprises selecting said insemination sample having a low number of sperm from a group consisting of an insemination sample having a low number of sperm, wherein at least 60 percent of said sperm have the desired sex